The VV&A Documentation Tool:

Automating the VV&A Process

SPAWAR Systems Center- Charleston
Code 324

NAVMSMO VV&A Documentation Tool
Automating the VV&A Processes

Milestones

•November, 2001	Began development of Turbo Tool Beta
•December, 2001	First review of the initial prototype
•January, 2002	Began build and review process
•April, 2002	Release of Turbo Tool Beta
•September, 2002	Began development of the VV&A Doc Tool
•December, 2002	Demonstration at I/ITSEC 2002
•June, 2003	Released Version 1.0 VV&A Doc Tool
•February, 2004	Released CD-Rom of v.2.0
•March, 2004	Released Web-Based Doc Tool

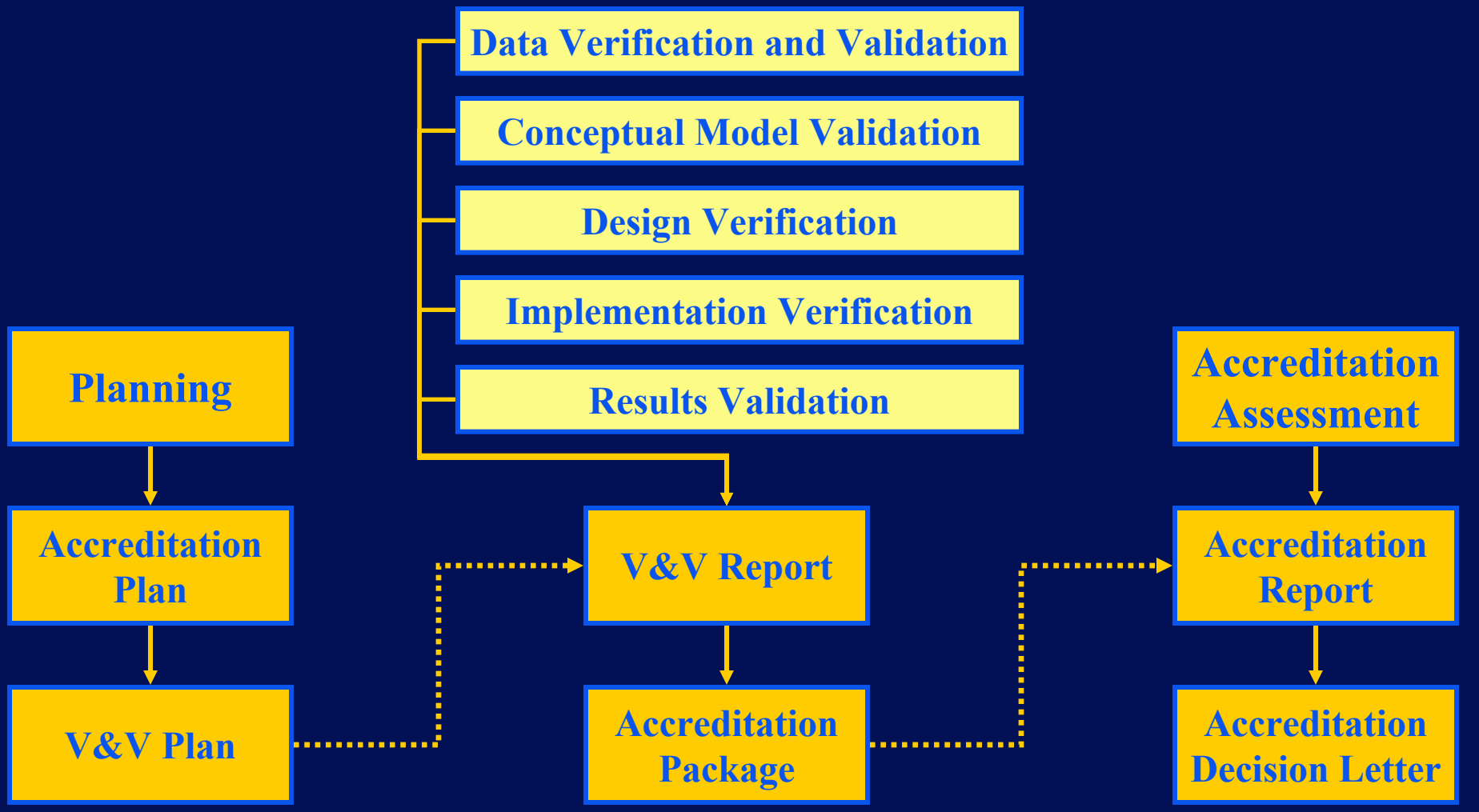
Automation of the Handbook

- The handbook is the tool used to ensure the Department of the Navy has all the information needed to implement efficient and effective VV&A processes.
- The VV&A Doc Tool is used to assist users to ensure that the guidelines of the handbook are being met.

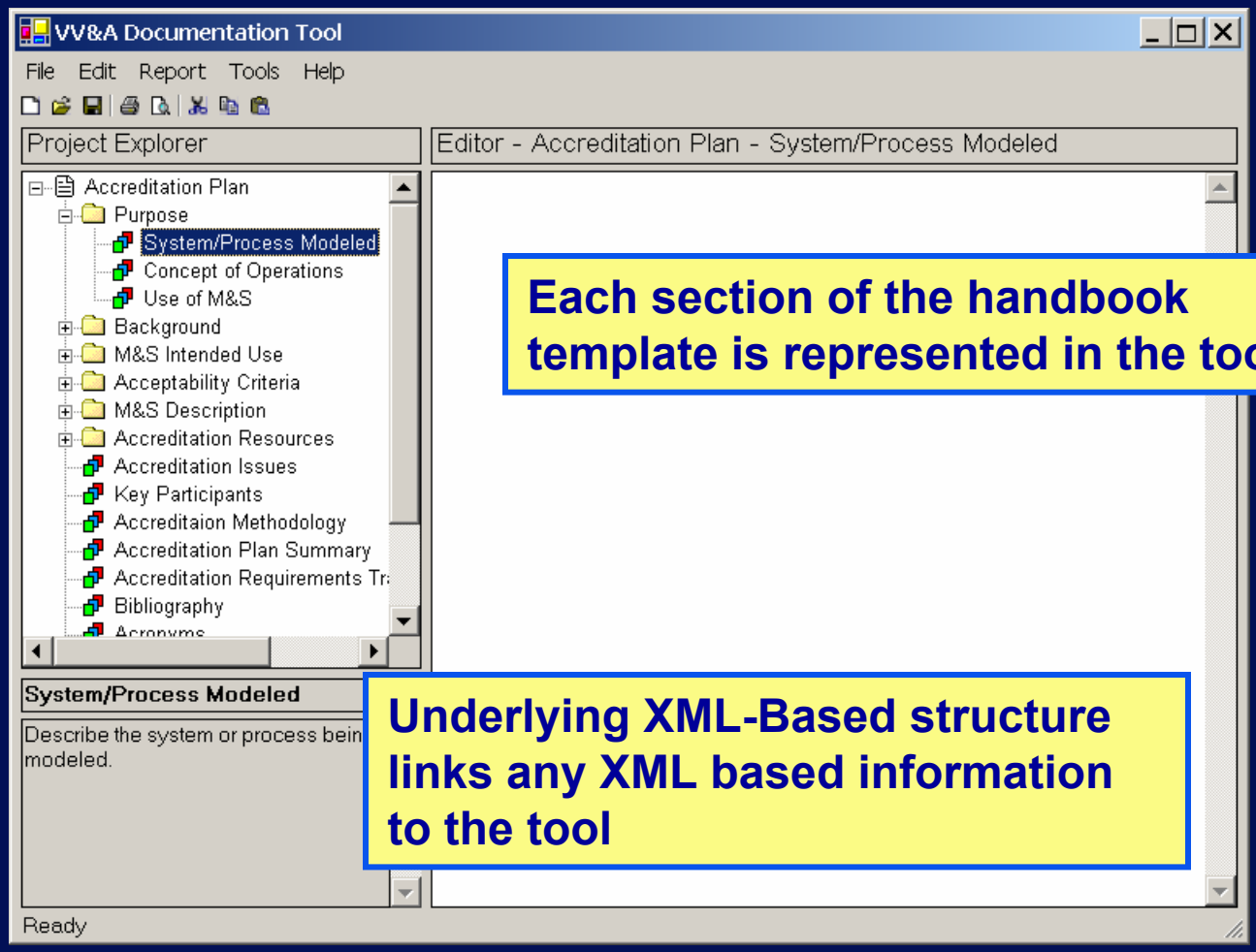
Need for the VDT

- Hesitation to conduct VV&A continues despite a DON mandate and implementation guides. Something further is still needed to activate and facilitate the VV&A documentation process.

Products of the VV&A Process



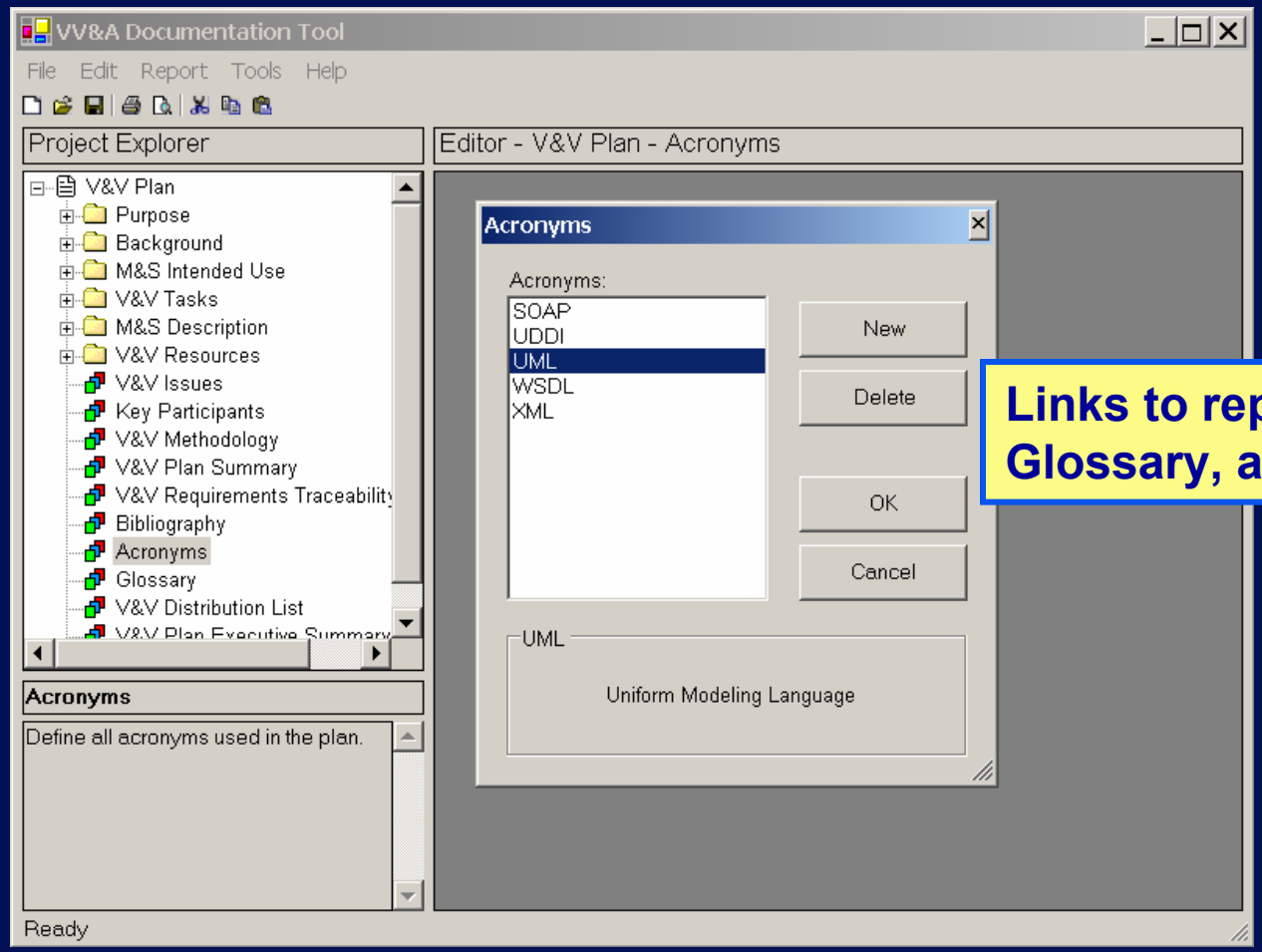
Preparing the Documentation



Each section of the handbook template is represented in the tool

Underlying XML-Based structure links any XML based information to the tool

Tools



Links to repository of Acronyms, Glossary, and Bibliography

VVML

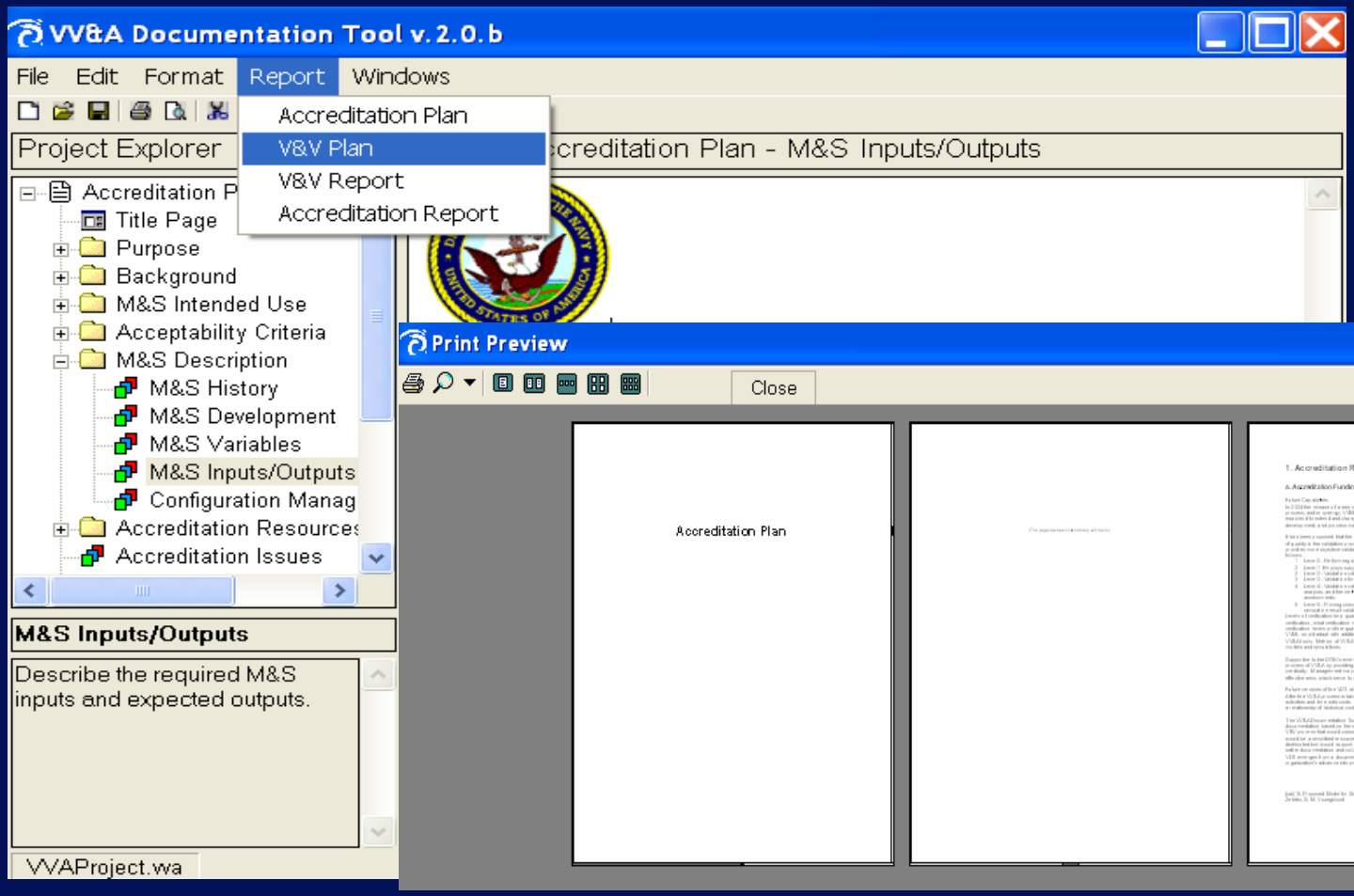
- Proposed VVML ("Validation and Verification Markup Language")
- The benefits of VVML range from high-level compatibility with web-based technologies within an extensible framework which will enable a new generation of M&S applications to emerge, develop and inter operate[1].

[1] Developing an XML Architecture for VV&A; The Development of the Verification, Validation Mark-up Language (VVML), 04S-SIW-027, 2004 Spring Simulation Interoperability Workshop, Washington, D.C., April 2004

VVML: The Need

- The impetus to simplify the documentation process with an intuitive format is the foundation for the creation of VV&A Markup Language (VVML).
- VVML provides a framework for creating both basic unidirectional links and more complex linking structures allowing documents to assert linking relationships among more than two sources.

Reports Generation



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- Change XML data from one format to another (for example, Navy Standards to DoD where joint simulations are present.
- Facilitates "Composability" by creating a standardized Metadata language for V&V. VVML gives the capability to select and assemble components to satisfy specific user requirements meaningfully.

VVML: Benefits

- Parts of documents can be formatted to allow programs to locate information inside the documents
  - For example, charts, graphs and embedded objects can be updated within the documents by updating source data.
- Apply or change data display information (for example, summarize key information on an Excel spreadsheet for Flag Officers or other decision makers without tinkering around hiding or locking the original data cells).

VVML: Integration with the VDT

- Requirements traceability functions are made possible with the underlying XML.
- VVML will make it possible for one document to contain multiple forms of data.

Here is a picture of a circle.

Here is the mathematical equation for a circle.

x 2 y 2 1

The ability to embed other XML languages, schemas or DTD's is this simple example of describing a circle

A circle can be described graphically, such as:

<img src="circle.gif" width="50" height="50"> or I may need to describe a circle mathematically by using MathML

```
<html xmlns="http://www.w3.org/TR/xhtml1/strict"
xmlns:mathml="http://www.w3.org/1998/Math/MathML"
xmlns:svg="http://www.w3.org/Graphics/SVG/SVG-19991203.dtd">
  <head>
    <title>A Circle</title>
  </head>
  <body>
   <p>Here is a picture of a circle.</p>
     <svg:svg width="300" height="300">
       <svg:ellipse style="stroke:#000000; stroke-width:3;
stroke-opacity:1; fill:#000000; fill-opacity:0" cx="150" cy="150"
rx="144" ry="144" />
     </svg:svg>
   <p>Here is the mathematical equation for a circle.</p>
   <mathml:math>
    <mathml:reln>
      <mathml:eq/>
      <mathml:apply>
        <mathml:plus/>
         <mathml:apply>
          <mathml:power/>
           <mathml:ci>x</mathml:ci>
           <mathml:cn>2</mathml:cn>
         </mathml:apply>
         <mathml:apply>
          <mathml:power/>
            <mathml:ci>y</mathml:ci>
```

The VDT and VVML

- The VV&A Doc Tool is the front-end to the VVML, as such no one needs to learn or manually create a VVML file.
- The complexity of VVML is hidden by the windows-like VV&A Doc Tool

Demo